

35. (New) A light-emitting device according to claim 28, including a stripe-shaped ridge structure which is positioned about 3 μm or more away from both ends of a mesa structure which is provided to form an n-type electrode.

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36. (New) A light-emitting device according to claim 28, including an n-type electrode formed on the back plane of the substrate having n-type conducting and a stripe-shaped ridge structure which is positioned about 3 μm or more away from both ends of the device.

REMARKS

Claims 12, 25 and 26 were considered by the Examiner. Claims 12, 25, and 26 stand rejected. In this response, claim 25 has been amended. Claim 12 has been cancelled. New claims 27 to 36 have been added. Therefore, claims 25 and 26-37 are pending.

Rejections under 35 U.S.C. 103

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Usui in view of Pribat (U.S. 4,999,314) and Bozler (U.S. 5,262,682).

Claim 25 as amended reads as follows:

25. A semiconductor substrate, comprising:
an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more;
an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;
an (n+1)-th patterned mask containing a material having a growth suppressing material *substantially provided above an opening of the n-th patterned mask*; and
an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask.

Support for amended claim 25 is found, for example, at pages 28-35, page 55, lines 4-23, and page 56, lines 1-8.

Claim 25 as amended teaches an (n+1)th patterned mask containing a material having a growth suppressing effect, substantially provided above an opening of the nth patterned mask. Usui in view of Pribat and Bozler do not teach or suggest, either alone or in combination, an (n+1)th patterned mask containing a material having a growth suppressing effect substantially provided above an opening of the nth patterned mask.

Usui teaches a silicon dioxide mask on a GaN layer grown on a sapphire substrate. Bozler teaches a growth mask with openings formed on a substrate.

Pribat at Figure 54 and column 12 teaches on a substrate a first insulation layer with openings and a second insulation layer with openings. The first and second insulation layers are achieved by a dielectric material. However, Pribat does not teach the second insulation layer provided substantially above the openings of the first insulation layer. Rather, Pribat teaches that the second insulation layer is provided substantially above the first insulation layer.

Thus, at least for the foregoing reasons, applicant respectfully submits that Usui in view of Pribat and Bozler do not teach or suggest all of the elements of claim 25.

Claim 26

Claim 26 is dependent on claim 25. Therefore, it is respectfully submitted that claims 26 is patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 25. Accordingly, Applicant requests withdrawal of the rejection of claim 26.

Claim 27 reads as follows:

27. A semiconductor substrate comprising:

an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more;

an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask;

an (n+1)-th patterned mask containing a material having a growth suppressing effect, *provided so as to be at an angle relative to the n-th patterned mask*; and

an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1) n-th patterned mask.

Support for new claim 27 can be found in the specification, for example, at pages 44-58.

New claim 27 teaches an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be at an angle relative to the n-th patterned mask. Usui in view of Pribat and Bozler do not teach or suggest, either alone or in combination, an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be at an angle relative to the n-th patterned mask.

Thus, at least for the foregoing reasons, applicant respectfully submits that new claim 27 is in condition for allowance.

Claim 28

Support for new claim 28 can be found in the specification, for example, at pages 71-82.

Claim 28 is dependent on claim 27. Therefore, it is respectfully submitted that claim 28 is patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 27.

Claims 29-32

Support for new claim 29 can be found in the specification, for example, at pages 36-37.

Support for new claim 30 can be found in the specification, for example, at page 38, lines 4-9.

Support for new claim 31 can be found in the specification, for example, at page 41, lines 8-21.

Support for new claim 32 can be found in the specification, for example, at page 44, lines 1-7.

Claims 29-32 are dependent on claim 26. Therefore, it is respectfully submitted that claims 29-32 are patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 26.

Claims 33-36

Support for new claim 33 can be found in the specification, for example, at page 72, lines 17-24, and page 73, lines 1-11. Support for new claim 34 can be found in the specification, for example, at page 74, lines 15-20. Support for new claim 35 can be found in the specification, for example, at page 77, lines 21-24. Support for new claim 36 can be found in the specification, for example, at page 78, lines 1-7.

Claims 33-36 are dependent on claim 28. Therefore, it is respectfully submitted that claims 33-36 are patentable over Usui in view of Pribat and Bozler at least for the reasons set forth above with respect to the patentability of claim 28.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 299002048410.

Respectfully submitted,

Dated: February 13, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

25. (Amended) A semiconductor substrate[,] comprising:

an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more; an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask; an (n+1)-th patterned mask containing a material having a growth suppressing material [provided on or above the lower substrate, the (n+1)-th mask at least having a surface which is positioned at a level different from a level of a surface of the n-th mask, with respect to a surface of the lower substrate] substantially provided above an opening of the n-th patterned mask; and an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1)-th patterned mask.

27. (New) A semiconductor substrate comprising:

an n-th patterned mask containing a material having a growth suppressing effect, provided on or above a lower substrate, wherein n is an integer of 1 or more; an n-th nitride semiconductor crystal layer grown on or above the lower substrate via the n-th mask; an (n+1)-th patterned mask containing a material having a growth suppressing effect, provided so as to be at an angle relative to the n-th patterned mask; and an (n+1)-th nitride semiconductor crystal layer grown on or above the lower substrate via the (n+1) n-th patterned mask.

28. (New) A light-emitting device produced by using the semiconductor substrate of claim 27.

29. (New) A light-emitting device according to claim 26, including a cladding layer of AlGaN made of a mixed crystal semiconductor material containing four elements and a trace amount of another element.

30. (New) A light-emitting device according to claim 26, including a quantum-well layer or a barrier layer each of which is made of a mixed crystal semiconductor material containing four or more elements including a mixed crystal containing the three elements of InGaN and a trace amount of another element.

31. (New) A light-emitting device according to claim 26, including a stripe-shaped ridge structure which is positioned about 3 μm or more away from both ends of a mesa structure which is provided to form an n-type electrode.

32. (New) A light-emitting device according to claim 26, including an n-type electrode formed on the back plane of the substrate having n-type conducting and a stripe-shaped ridge structure which is positioned about 3 μm or more away from both ends of the device.

33. (New) A light-emitting device according to claim 28, including a cladding layer of AlGaN made of a mixed crystal semiconductor material containing four elements and a trace amount of another element.

34. (New) A light-emitting device according to claim 28, including a quantum-well layer or a barrier layer each of which is made of a mixed crystal semiconductor material containing four or more elements including a mixed crystal containing the three elements of InGaN and a trace amount of another element.

35. (New) A light-emitting device according to claim 28, including a stripe-shaped ridge structure which is positioned about 3 μm or more away from both ends of a mesa structure which is provided to form an n-type electrode.

36. (New) A light-emitting device according to claim 28, including an n-type electrode formed on the back plane of the substrate having n-type conducting and a stripe-shaped ridge structure which is positioned about 3 μ m or more away from both ends of the device.